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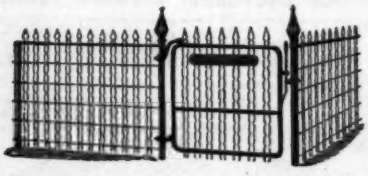

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Garden and Forest.

Among the contents of next week's issue (No. 164) will be the following articles:

The Sap and Sugar of the Maple-tree.
By WM. D. ELY.

The Wild Garden.
By AMY WIGHTMAN.

Lælia anceps, var. holochila. (With figure.)
By R. A. ROLFE.

Winter Studies in the Pine Barren Flora of Lake Michigan.
By E. J. HILL.

The paper will contain an illustration of a Sugar Maple, from a photograph, and a figure of a flower of Lælia anceps, var. holochila, from a drawing by Mr. C. E. Faxon.

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A Botanic Garden for New York.

THE educational equipment of a modern city of metropolitan pretensions, as has been pointed out more than once in these columns, cannot be considered complete without a public garden, administered by a man of science in a scientific spirit, as a station of scientific investigation and public instruction. These views have gained a foot-hold in the community, and there is, at this writing, every prospect that the bill "to provide for the establishment of a Botanic Garden, a Museum and Arboretum in Bronx Park" will be enacted by the present legislature, it having been passed successfully through all the preliminary steps. By this bill the park commissioners of the city of New York are directed to set aside 250 acres for a private association which asks to be incorporated to carry on the garden. The purpose of the association is to establish and maintain a Botanic Garden, Museum and Arboretum for the collection and cultivation of plants, flowers, shrubs and trees; for the advancement of botanical science and knowledge, the prosecution of original researches in botany and kindred subjects, for affording instruction in these subjects, and for the exhibition of ornamental and decorative horticulture and gardening; for the entertainment, recreation and instruction of the people. In the list of the incorporators appear the names of some of the most intelligent and public-spirited, and some of the wealthiest men in this city; and it is safe to say that, if they are thoroughly in earnest in their desire to bestow upon the city a great botanical establishment, and if they realize what such an establishment should be, there need be no serious anxiety for its future.

The site selected for the proposed garden is an excellent one; the territory it provides is ample, its surface is pleasantly varied, and its situation has the advantage of being near enough to the centre of population to be readily accessible, and, at the same time, sufficiently remote to be beyond the injurious influences of the vitiated atmosphere of the city. The corporation is to raise the sum of $250,000, with which to establish the garden, and when it has done this the park commissioners of the city are to expend a sum, upon which the income is $15,000, in preparing museums, herbarium buildings, lecture halls and structures for the cultivation of exotic plants, and to construct and maintain the drives through the garden and arboretum, and provide for their policing.

The sum which the city is asked to expend on buildings seems ample for many years at least, but if the general excellence of the plan is to be criticised at all it is in the meagre amount which the new corporation is expected to expend. The city is to build and maintain roads and to spend $400,000 or $500,000 in providing buildings, but when this is done the corporation will hardly be in a position, with an income of only $10,000, to carry on and gradually develop a great herbarium, library and museum, to plant an arboretum, to stock greenhouses with representatives of the tropical flora of the world, to establish gardens of hardy perennial and annual plants, to keep up rock-gardens and shrubberies, water-gardens and bog-gardens, and all the other departments of a modern botanical establishment.

A botanical garden is a museum, and, like all museums, its value depends on the capacity of the man who controls it; it is useful or inefficient in proportion as its head understands the true aim of a museum and has the patience and executive force to carry out his ideas. The man who is equipped to organize a garden in this city which is eventually to occupy an area of 250 acres, and is to place it in such a position among the scientific establishments of the world that its claims and importance will be recognized, is not easy to find; and he will be able to command a salary which will make a large hole in the income of the fund of $250,000. The gradual building up of a herbarium and library, the heart and brain of every scientific garden, and their administration will consume the rest, so that unless a much larger sum of money is provided than the promoters of this scheme now seem to have in mind, there is great danger that the garden will languish, and that those persons now most interested in it will become discouraged. We say this not to add in any way to their discouragement, but only to emphasize what we have said before—that the establishment of a great botanical garden is a serious and difficult undertaking. A garden of this sort is one of the most complicated things a man can be called on to manage; it costs a great deal of money, its growth must be slow, and those who plan such an establishment and labor for it in its inception cannot hope to gather the fruits of their labor. Art is long and the span of human life is short. But it is one of the most hopeful signs of our civilization that men occasionally appear who are really unselfish and are willing to work for the public good without hope of great reward and without expectation of seeing their labors bear fruit in immediate tangible results. The man who lays the foundation of the great garden which is now contemplated, and which we believe our children will live to see firmly established in the Bronx Park, will be a man of this character. It was such a man who came to Kew Gardens just fifty years ago; and since it is by Kew that the promoters of botanical establishments are accustomed to measure their ambition, it will be useful to explain in a few words what Kew is and why it has become what it is.

Fifty years ago the British Government, principally at the solicitation of the then Duke of Bedford, a man famous in his time for his enlightened enthusiasm in gardening which made Woburn Abbey one of the great gardens of England, determined to convert the old gardens and pleasure-grounds surrounding the royal palace at Kew into a public botanical establishment. Sir William Hooker was invited from Glasgow to manage it. He brought with him a European reputation as a botanist, unflagging zeal, industry and enthusiasm, a fund of sound Scotch common sense, the friendship and confidence of all naturalists, and the largest botanical library and herbarium which had at

that time been made. These last he presented to the nation; his reputation and the importance of his collections at once attracted botanists to Kew from all parts of the world. Their visits benefited the establishment, and plants, specimens and books poured into it from all sides. The scientific character of Kew was thus established, and it is this high character that has given it the lead it has long held among the gardens of the world. Sir William Hooker gave the remainder of his long life to Kew, and devoted all his energies and resources to its welfare. His son, a man more famous than the father, succeeded him, and under his administration Kew gained wonderfully in every direction, especially in popular favor. The second Hooker retired from Kew a few years ago full of honors, handing down the administration of the garden and all the family traditions to a connection by marriage, under whose wise and broad management it is growing now still more rapidly than ever before in usefulness and beauty. In no other spot in the world can so many different plants be seen growing; the museums of economic botany are unequaled, the herbarium is the most extensive that men have ever made, and the library is unsurpassed. This is the work of fifty years, carried on by men of extraordinary ability and world-wide reputation, working under the most exceptionally favorable circumstances and with the whole British nation behind them. Kew has received many gifts of great value, and is receiving such gifts every week. It costs, however, to carry on the establishment, which, by the way, does not cover much more than half the area to be occupied by the New York garden, $75,000 or $80,000 a year. The cost of all sorts of garden labor in England is not more than half what is paid for such labor in this country, and everything connected with a garden costs less there than it does here. If, then, Kew furnishes the ideal at which the promoters or the projectors of the new garden aim, they must realize that this can be reached only by the expenditure of a great deal of money, and that even with all money needed such results as the people of New York have the right to expect can only be brought about slowly and with the aid of unusually favorable conditions. Something can be accomplished with $250,000, but this amount is only a beginning, if New York expects to rival London, or St. Louis, or Boston in its Botanic Garden.

Pruning Shrubs.

OUR climate is so favorable to the growth of deciduous, flowering shrubs that they are steadily growing in use and favor in American gardens. The time will come when we shall learn to give them good deep soil, and allow them enough space to develop into their best form. The time will come, too, when they will suffer less serious mutilation at the hands of unskillful laborers who feel called upon to "trim them into shape" every spring. Directions for proper pruning have often been given in horticultural journals, and although the principles which underlie correct practice have been set forth so plainly that no one need err, the necessity of repeating these instructions again and again is apparent to all who take note of the cruel treatment to which many shrubs are subjected.

In the first place, it should never be forgotten that pruning is a weakening process. It takes away from the plant a portion of its vital machinery, and when the cutting is severe the loss of vigor is serious. As an example of this, florists are learning that the present demand for long-stemmed Roses is a tax upon the vitality of the plant, and they have found that they are selling not only flowers but the life of their plants, and after one crop has been taken the bush needs a long rest to recuperate its exhausted energies. Last summer the luxuriant foliage upon some White Maples in a city street was pointed to as a proof that pruning added vigor to the trees. During the previous winter it is true that the limbs had been sawed off nearly to the trunk; but the mass of leaves on the slim twigs which had put out in great numbers from every adventitious bud on the stumps of the amputated limbs was only a proof that nature was making this extra effort to supply the nutritive organs of which the tree had been robbed. This spasmodic output of leaves was not a sign of health, but a signal of distress. Of course, pruning is necessary for many purposes. The removal of dying limbs is remedial. It may be of more importance to increase the fruitfulness of a vine or tree than to promote its longevity, or it may be necessary to change the form of a shrub or tree in order to adapt it to its position and surroundings.

The usual reason offered for the severe pruning of shrubs is that it makes them more floriferous; but the work is often done at such a time and in such a way that it destroys all hope of flowers for the year. A little examination will teach a novice that the shrubs which are to bloom early this spring made all their preparations for it last year. The flower-buds were formed on the wood which ripened last summer, and they were nicely covered up to protect them during the winter. This can readily be proved by cutting off some twigs from a Peach-tree or Thunberg's Spiræa and placing them in water in a jar which is kept in the sunlight in any ordinary living-room. In a short time the buds will open and the flowers will appear, and the experiment could have been successfully made at any time during the winter. Now, when these limbs are cut back severely at this season of the year all the flower-buds are cut away, and we need expect no flowers this year. If we wait until after these early-flowering shrubs like the Forsythias are through blooming, and then cut back the wood which has borne the flowers, new branches will be thrown out to make up for the part which has been taken away. These branches will ripen up during the summer and form flower-buds for blooming next spring. Hence, the first rule to be observed in pruning early-blooming shrubs for the sake of their flowers is: Cut back the growth in late spring or early summer as soon as the flowers have fallen, and never do this pruning in autumn, winter or early spring.

On the other hand, there are shrubs like the Altheas and the Hydrangeas which bloom late in the season, and in these the flower-buds are formed on the wood which grows the same summer. It follows that if these were pruned in early summer the effect of destroying the flowers would be almost as bad as winter pruning would be in the case of the early-flowering shrubs. But if the last year's growth is now cut away before any of the new wood starts the plant will put forth more shoots which will bear flowers in autumn. In the case of such shrubs, therefore, the pruning should also be done after the flowering season—that is, in late autumn, or better in the early spring.

These rules are very general, and they do not cover all cases, as, for example, there are some early-flowering shrubs which do not make their flower-buds on the shoots which were made last year, but on short spurs from the older wood. It may be also said that pruning for flowers alone is not altogether judicious, for shrubs are in bloom but a few days or weeks at the most, and a good gardener will give heed to their general appearance throughout the year. For this reason it is good practice to encourage the shrubs to develop into their best natural form, and this is not done by cutting them back with the simple view to increase their flowers. The proper course is to thin out the feebler and overshadowed branches, so as to give the stronger ones a better chance to develop, and to cut back cautiously, so as not to interfere with their natural and most beautiful form. They will then give pleasure all the year through, not only when in flower and when in full foliage, but even in the leafless season; for shrubs have a distinct and peculiar beauty in the winter, not only from the graceful outline of their spray, but from the delicate color which comes from the mingling of the varied tints of the bark on the branches—a color which seems to rest upon and float about them like a nimbus or halo. All this beauty at every season can be marred by careless shearing, or, what is still worse, by a painstaking effort to cut the shrubs into formal shapes. There is never any justification for clipping them into geometrical forms, like cones or cylinders or spheres; nor for shaving off their tops at the same level as if they were parts of a hedge fence. This means the destruction not only of the beauty, but of the health of the plant.

The one pleasure which is common, constant and universal to all parks results from the feeling of relief, experienced by those who enter them, on escaping from the cramped, confined and controlling circumstances of the streets of a town; in other words, a sense of enlarged freedom is to all at all times the most certain and valuable gratification afforded by a park. The scenery which favors this gratification is therefore more desirable to be secured than any other, and the various topographical conditions of a site, thus, in reality, become important very much in the proportion by which they give the means of increasing the impression of undefined limit.—*Olmsted and Vaux, in Report of Brooklyn Park Department, 1866.*

The Colonnade in the Parc Monceau, Paris.

THE Parc Monceau has already been described in GARDEN AND FOREST,* so it is needless again to tell how it originated, or to note the general characteristics which, despite the introduction, in inappropriate situations, of an excessive multitude of bedding-plants, make it the prettiest of Parisian pleasure-grounds. We now desire simply to call attention to the picture on page 163, which shows a portion of a long, curving colonnade, shaded by trees and luxuriantly draped in Ivy, that stands on the edge of an oval basin of water. It is the most charming and individual feature of the park, and seems especially interesting when we find that it was not built in willful imitation of a ruin, but is a veritable relic of former days. It dates from the best period of the early Renaissance, though, singularly enough, its exact origin is not known. According to one tradition, it was brought from the destroyed Château de Raincy; according to another, which is more generally held, it was part of a great rotunda which Catherine de Medici commenced to build, north of the Church of St. Denis, to receive her own mausoleum and that of her husband, Henri II., and which was torn down in the beginning of the eighteenth century. In his book on "Paris in Old and Present Times," Mr. Philip Gilbert Hamerton writes: "Nothing can be more elegant than this colonnade. . . . In its present situation it seems like a remnant of antique architecture in some graceful picture by Claude, and one is grateful for the good sense that has saved it from destruction. Lalanne once made a very poetical charcoal drawing of it, which has been reproduced in the series of his charcoals. This is one example . . . of the happy combination of architecture with foliage and water. Set up in the British Museum these columns would signify comparatively little; but with graceful foliage and a mirror of water they are charming."

Some of the beautifully proportioned columns, with their delicate flutings and rich Corinthian capitals, can be more plainly seen than those which our picture presents; yet it would be hard to find more charming objects than these. No plant is more classic in its effect or in its historical associations than the Ivy, and it adapts itself as well to the stately simplicity of a piece of classic work like this as to the broad simple rugged masses of a Norman castle-wall or to the slender arches and elaborate carvings of a ruined Gothic abbey. It is a misfortune that, in the dry climate of our northern states, Ivy does not grow so well as it does even in the northern parts of Europe. But in sheltered situations, and especially in southern localities, it well repays the gardener's care. It is not so free and spreading in habit as the Virginia Creeper, yet it does not, like the so-called Japanese Ivy, cling so tightly to its supports that it becomes a close-fitting garment rather than a drapery; and over both of these it has the advantage of keeping its beautiful dark green foliage throughout the winter. Moreover, it grows as well when trailing on the ground as when climbing a wall or column, and this peculiarity is very useful when the gardener is trying, as so often is desirable, to connect an architectural feature integrally with its natural surroundings. Beautiful borders of Ivy are constant features in European pleasure-grounds, and our picture shows how such a border can serve the artistic purpose just referred to while forming a delightful object in itself. When trees instead of columns are draped with Ivy, and it is then allowed to run out over the grass, whether in a formal or a naturally luxuriant way, the effect is equally charming.

We would also call attention to the fine effect of the statue on the little island which occupies the centre of the basin. Had it been stood in a commonplace fashion in the middle of the island, it would have been much less impressive than it now is, reflected with its massive pedestal in the silent water, supported by the tree-trunks just beyond it, and backed by the low mass of shrubs. There is no one point where we have more to learn from the French than with regard to the placing of statues in the open air.

Winter Studies of the Pine Barren Flora of Lake Michigan.—I.

IT is the common practice of those who study plants in their native wilds to observe them mainly during their season of growth. A stroll in the woods in winter, or a botanical excursion when the ground is covered with snow, seems out of place and without adequate reward. But the trees and shrubs in winter, the mosses and lichens which cling to their trunks and limbs or grow beneath their shelter, and the humbler plants with evergreen or persistent leaves offer inviting subjects for study. Acquaintance with a plant is not complete till it is seen in all its phases. The evergreens may not exhibit any essential change of garb in summer and in winter, but they seem more isolated now and contrast more impressively with their deciduous-leaved neighbors. The leafless branches of the deciduous trees also show features of form and covering and teach lessons which are concealed when they are thickly clothed with foliage.

There is also a stillness in the woods in winter which is most impressive. This is due largely to the absence of animal life, and the feeling of loneliness is deepened by the plaintive murmur of the wind among the Pines. The cawing of the crow or the harsh cry of the blue-jay almost startles by its suddenness. But the sense of loneliness soon passes away, for though the currents of life in the forest-vegetation are in suspense the trees themselves are here, ready to furnish lessons and companionship.

One of the first plants to catch the eye in the Pine Barrens, where the soil has sufficient strength to bear it, is the Climbing Bitter-sweet (*Celastrus scandens*). It does well in the moist sands near the lake, holding to the small trees by its twining, rope-like stems. In the early winter its branches are spangled with fruit, the open valves of the orange-colored pod spreading out like a border and exposing the scarlet aril which covers the seeds. Few sights are gayer at this season than the bright fruit, set in a background of the sombre, leafless branches of the vine and its supporting tree. Near by is another climbing vine, the Greenbrier; its dark green, prickly stems clambering over the shrubs and contrasting with their duller hue like a line sharply drawn across them.

There are other shrubs with red or yellowish fruit often met with in the sands or beside the sloughs. Among them are four species of Rose, their stems usually red or reddish in the winter, with a hue more pronounced than in the summer. The hips of *Rosa blanda* and *R. humilis* are apt to be shriveled and dull, not so lasting as those of *R. Carolina*, which keep their form and colors, being plump and bright, and clinging profusely to the bushes in winter. In the wetter ground, where the latter grows, or along the lake-shore, clumps of *R. Engelmanni* are seen, with its oblong fruit still in good state of preservation and rivaling that of *R. Carolina* in abundance. The hips are not generally so ruddy, but have a yellowish tinge. Just before Christmas I looked for the scarlet fruit of the Winterberry (*Ilex verticellata*), but failed to find any, though it was plentiful on the bushes late in the fall. Probably the birds are responsible for their barren look, for they are fond of the berries. But it is not always thus, for the numerous clumps of Ilex by the borders of ponds will display their red berries in the winter, as the common name affirms.

Not so tempting nor so worthy of notice are the clusters of small, whitish berries of the Poison Ivy (*Rhus Toxicodendron*), a common plant in the sands, especially along the roads and cattle-paths. It is almost always the erect form of the plant, a foot or two high, which we see, or the one which runs along on the ground, sending up short branches. It retains its fruit all winter, for this may be found late in the spring, or well up to the time of flowering again. Doubtless it partakes of the poisonous properties of the plant, so that birds avoid it, for I have never seen it eaten by them. Its dun color does not make it prominent like the bright-colored fruits which allure birds, even if it is edible by them. The Stag-horn Sumach (*R. typhina*) is a more attractive shrub than its poisonous relative, and quite common by the borders of woods and in their open spaces, its crimson leaves making it one of the most brilliant features of autumn. The large thyrsoid clusters of fruit, clothed with crimson hairs, still cling to the ends of many of the stout, straggling branches, and serve to make it a conspicuous object in the winter also. The blunt, clumsy branches, dark with sooty bark and hairs, are in marked contrast with those of any neighboring shrub. In handling them one instinctively looks at his fingers to see if they have been blackened by the twigs. The buds are also curious, being deeply set in the midst of a large leaf-scar, and capped by a covering of light russet hairs, thus looking like a blunt cone surrounded by a broad, flat rim. The rudimentary leaves, buried under this copious coating of hairs, seem as if protected against arctic cold. The Fragrant Sumach (*R. canadensis*) is frequent on sandy banks and knolls. It usually occurs in patches of a limited area, but thickly covers the space it occupies. It is a dwarf shrub, but a foot or two high, and is a pretty object at any time of the year—in spring yellow with numerous flowers, in summer clothed with handsome, trifoliate leaves, interspersed with clusters of downy, red fruit; in autumn showy with richly colored foliage; grayish

* See Vol. II., December 11, 1889.

in winter and speckled with little spikes of flower-buds. These appear as the leaves fall off. They resemble small aments and will bear close inspection. They are formed of reddish brown rhomboidal buds, symmetrically arranged on the axis of the cluster. Each bud has a fringe of light-colored hairs, and a dark centre, sharply contrasting with this pale border, and looking as if set in a frame of hairs. The tiny spikes have a checkered appearance, and viewed in mass give to the plants a delicate charm.

The most common evergreen shrub is the Bearberry (*Arctostaphylos Uva-ursi*), literally covering the surface of some of the sand-ridges near the lake, and abundant in places farther away. The globular berries, dark red or brown, still hang to the vines, but the varied colors of the leaves are their chief distinction. In sheltered localities some of the thick obovate or spatulate leaves remain of a shining green, but the greater part have assumed tints of brighter color. The typical colors, aside from green, are crimson, purple and vinous, and there are all gradations in the shades connecting these. The nearer leaves, near the ends of the stem and branches, are mostly of the brightest colors, especially the crimson shades. These colors often give to the ground a very gay appearance, as if covered by a carpet of variegated pattern, the splashes of color being extensively intermixed. When the stems rest upon a slope the effect is striking, or even brilliant. The stems are slender and whip-like, branching but little. They sometimes have a length of four or five feet, particularly on the slopes of ridges near the shore of the lake, where they run along the surface of the sands and attain their greatest vigor. Gathered at this season, or late in the fall, after the leaves have changed, they serve admirably for decoration. The leaves remain attached to the stems a long time in the dry heat of a house, and retain their colors well, so that they can be kept upon a wall from one season to another.

Englewood, Ill. *E. J. Hill.*

How We Renewed an Old Place.

II.—PLANTING WILLOWS AND PINES.

WHEN one has nearly half a mile of boundary to define around his four-acre lot, the question arises how it can be enclosed with the least expense and trouble, and in such a way as not to disfigure the grounds. With this problem we had now to deal.

The front upon the main street, thanks to the sociable fashion of our day, it would be quite proper to leave open, with only such screen of shrubs and trees as we should decide upon when the house was built, and the lawn properly graded. Part of it was already well hedged in with ancient bushes which straggled about where the old house stood, in most admired disorder. But all along Winter Street, as the lane behind us is somewhat ambitiously designated, the fence was tumbling down, and the whole garden spot lay uncomfortably open to view, as well as to the cold east winds that blow across the meadow from the sea. We decided that here a row of Willows would come in admirably, as there would be plenty of rich moist soil for the young trees to root in, and with such a protection the wind-swept garden would in time be warm and secluded, while the silvery foliage would be a harmonious setting for the emerald meadow, and the sapphire stream.

This idea we carried out the week after we made our purchase. A friendly farmer neighbor, compassionating our folly in starting such an enterprise, but anxious to see what we would make out of the place, kindly offered to give us as many cuttings as we wanted, so one bright day in June he appeared upon the scene with a cart-load of Willows, a crowbar, and a hatchet, and, with a man or two to help him, before night he had cut and driven firmly into holes, easily punched by the crowbar in the soft soil, some five hundred bare stakes, every one of which in a few weeks put forth a crop of roots and leaves.

The stakes, sharpened at the end, were about three feet in length, one foot of which was driven into the ground, and firmly stamped into place. It was found better in driving them to have them set at an angle of about twenty degrees, with the tops pointing toward the south, so that the stems did not receive the full force of the midday and afternoon sun. We used the common White Willow (*Salix alba*), which abounds along swampy road-sides everywhere in New England.

These trees have all thriven well, though, owing to the marsh being salter in certain places than in others, some have grown less rapidly than their companions. The fear of the salt-water led us into the error of planting one row of trees at first inside the fence, and at some distance from it, where the presence of Clover and English Grass showed that the top soil was fresh. Subsequently, when they were well rooted, we removed them to the outside along the highway, where they now begin to make an agreeable shade, and an effective screen. The annual dumpings of sand made by the town along the edge of the road, to maintain its level which constantly tends to sink into the marsh across which it has been carefully built, seem to help the trees, which continue to send out surface-roots as the ground rises about them; and though some of them during their first seasons had a sorry time of it in dry, hot weather, they ultimately pulled through, and are no longer sources of anxiety.

The most exposed portion of the place being thus provided for, we turned our attention to the barren hill-side, which was a pretty hopeless-looking spot for trees of any kind. This elevation, some forty feet high and running back nearly 600 feet from the main street, seems to be the bank of some former water-way; at least I like to fancy that the odd terraces, which break its otherwise even slope, represent the gradual subsidence of some body of water which must once have filled the gorge, when the present meadow was an arm of the sea. Gravel and sand, mixed with moderate-sized cobble-stones, are its constituent parts, nothing like a boulder having come so far down. We have often regretted that some of the noble rocks which abound on the other side of the street, farther up the former stream, were not on our hill to form a feature in our landscape-gardening, marked as they are with the scratches which show the grinding of some primeval glacier.

Over the rough foundation of our hill a thin soil has formed itself; fairly deep on the level top where the plain begins, but constantly washed off down the sides into the swale below. It seems hardly possible that trees can ever have grown here, nor are there the smallest traces of any in or upon the soil; but here we resolved that trees should grow; and again the farmers mocked at such a wild idea, and looked forward with sombre satisfaction to our discomfiture.

But how to set about it?

To plow the surface, unless we could yoke a goat to the plow, seemed impossible, since we had just seen a man and a horse and a dump-cart roll together, in a confused but unharmed heap, from the top to the bottom, on account of an incautious step off of the level. Even if we could have plowed the ungrateful soil, of what use would it have been, since there was nothing to bring to the surface but stones? Cultivation being apparently out of the question, the trees would have to take their chance, and a wretched chance, too, for the south shore of Massachusetts Bay is subject to long and severe droughts and to several months of hot weather in the summer.

But here we were upheld by our authorities. An excellent book on forestry gave us some consoling statistics, and later, Garden and Forest was invaluable in its suggestions. We found that in reforesting hills in France and Switzerland that had been swept bare by avalanches, a north-east slope proved the most favorable exposure for the growth of young Pines, and, if we had nothing else, we had plenty of north and east, with the winds thrown in; so, if that was the sort of thing that they liked, why, bring on the Pines, and let them have all they want of it.

But by the time we got round to this job, as the farmers say, the season for spring-planting of Pines was over, and an exceptionally dry and burning summer was in full blast, and the very grass on the hill was crisped and dry. Our impatience, however, was too great to permit us to wait for another year to begin our experiment. We had read some accounts of August planting of Pines, and determined to have our little fling on the spot, and find out for ourselves whether it was a good time or not.

So we waited, as anxiously as the prophet Elijah, for the first sign of rain, and when at last the brassy heavens veiled themselves in cloud about the middle of August, we started off after trees—not the pampered darlings of a nursery, used to water and rich soil, but the hardy road-side denizens of dry pastures and sand-hills. We picked out the driest and sandiest spots to dig them in, so that if their roots discovered nothing to feed upon in their new locality, they would, from long habit, have got used to short commons, and could adapt themselves to the situation.

Before going out we had the men dig holes over the surface of the side hill with a grub-hoe, banking up the thin soil at the lower sides of the holes with sods, so as to make little dams to retain the water; in these holes we set the trees we selected, which were not over three feet high, but stocky and well rooted. When possible we took up the dirt with them, keeping their roots moist, and well shaded in the cart, and no more were brought at a time than could be set in two or three

hours. After they were all planted, with great labor and trouble, we gave our nursery a thorough watering, and then, except on two or three subsequent occasions, when things looked really desperate from drought, they were left to take their chance. Luckily that year the rains began to fall soon after they were set, and the autumn was a very wet one, so that a good many of the little trees were living in the spring; but another batch, set in the latter part of May the following year, owing possibly to the very heavy rains of 1888 and 1889, did so much better, that we shall always be disposed to give the preference to spring planting in the future.

Of some 150 Pines set out upon this barren northerly hillside, under these cruel conditions, about eighty survive, a few of which are still leading a precarious existence, while the greater part are flourishing bravely, making a fine show in winter against the snow. In summer they shade so completely into the unkempt green background of the hill that, unless seen in profile, they are barely visible, even when five feet high, and very bushy. Still farther back we have tried setting out very small Pines, and have sown the ground in autumn with countless Pine-seeds, and nuts of all sorts, which come up satisfactorily enough, and do bravely for a month or two, but suffer dreadfully in July and August. They are a fruitful source of anxiety and disappointment, because they cannot make up their minds whether to live or die. The young Oaks are especially trying in this respect, for when we have fairly given them up for lost, they thrust out a feeble little leaf and make a fresh effort at existence, but at this rate a millennium

Fig. 29.—Phyllanthus pallidifolius.—See page 162.

will be too short for them to get their growth in. I have read somewhere that an Oak grew from an acorn in this commonwealth of Massachusetts, forty feet in fourteen years, but if these hill-side acorns achieve fourteen feet in forty years we shall feel we have not lived in vain.

"What do you do to make trees grow?" I asked an Englishman who was coaxing along a rebellious Butternut to some show of vigor.

"Oh!" said he, "I just talks to 'em, and tells 'em to grow, and they grow."

Mindful of this advice, I do not fail to exhort these recreant acorns, but no teacher of a primary school ever had a worse time in getting a shoot out of a young idea, than do I out of this infant class of refractory nuts and seeds.

Hingham, Mass. *Mary C. Robbins.*

New or Little Known Plants.

Phyllanthus pallidifolius.

THIS plant, which is a native of Java, is more often met with in gardens, under the name of *Reidia glaucescens*. It belongs to a vast genus of the Euphorbia family, with four or five hundred species scattered over the warmer parts of the world's surface. The name is formed from two Greek words, meaning leaf and flower, and was given to these plants because, in some of the species, the flowers are produced from the edges of what appears to be the midrib of a long compound leaf, but which is really a branch, the organs which look like leaflets being true leaves.

Phyllanthus pallidifolius will not, perhaps, interest people who find little to admire in plants which do not produce large and showy flowers. It is a small shrub of graceful habit, with bright fresh green foliage, pale and glaucous on the under surface, as beautiful as that of many Ferns. It is, for this reason, well worth cultivating in collections of stove-plants. The flowers, which are graceful and pretty, are produced during the summer and autumn in great profusion, and hang from the branches on long, slender, bright red pedicels, the males solitary or a few together from the axils of the lower leaves, the females solitary toward the ends of the branches. They have no petals, but the sepals are yellow, with fringed margins, and are marked with bright red at the base. This plant, like the others of the genus which are occasionally cultivated, flourishes in a compost of sandy loam, mixed with a little fibrous peat, and requires thorough and careful drainage. It may be easily increased by cuttings struck with bottom heat.

Our illustration on page 161 is from a photograph of a plant in the collection of Mr. J. L. Gardner, of Brookline, Massachusetts.

New Orchids.

Cochlioda Noezliana, Rolfe.—This is a charming novelty, of very graceful habit, bearing a branching panicle of medium-sized, orange-scarlet flowers with a yellow disc. It was introduced by Messrs. Linden, L'Horticulture Internationale, Parc Leopold, Brussels. A plant was exhibited at a meeting of the Royal Horticultural Society on November 11th last, when it was awarded a botanical certificate. It is dedicated to Monsieur John Noezli, its discoverer. According to an advertisement in the *Gardeners' Chronicle* for February 28th last (page 258), the species is a native of the Andes of Peru, growing at an elevation of 9,000 feet above sea-level. It belongs to a small genus closely allied to Odontoglossum, under which genus and Mesospinidium the species are generally known in gardens.—*Lindenia*, vol. vi., p. 55, t. 266. (English edition, vol. i., p. 9, t. 266.)

Peristeria aspersa, Rolfe.—An interesting species, allied to *P. Rossiana*, Rchb. f. It was discovered by Monsieur Bungeroth on the declivities of the Sierra de Marawaca, one of the most elevated mountains of the Parama chain, in Venezuela. This collector sent specimens to Messrs. Linden, L'Horticulture Internationale, Parc Leopold, Brussels, in whose collection it flowered last year. The flowers are borne in short racemes of about ten each, the color light brownish yellow, densely spotted or speckled with innumerable small spots of reddish brown, and the lip of a darker color, bordering on crimson.—*Lindenia*, vol. vi., p. 57, t. 267. (English edition, vol. i., p. 11, t. 267.)

Schomburgkia Sanderiana, Rolfe.—This is a very handsome Schomburgkia, introduced by Messrs. F. Sander & Co., of St. Albans, about three years ago, and now flowering for the first time. It is a plant of medium size with hollow pseudobulbs, very rigid leaves, and a lax, somewhat branched, panicle of rosy carmine flowers. It is allied to *S. Humboldtii*, Rchb. f., which, however, is easily distinguished by its much more elevated and acute keels, and other differences.—*Gardeners' Chronicle*, February 14th, p. 202.

Cypripedium × Creon, Veitch.—A new hybrid raised between *C.* × *Œnanthum superbum* and *C.* × *Harrisianum superbum*, the latter being the seed-bearer. It is about intermediate in character; the dorsal sepal is dark red-brown, with a white margin, and the petals and lip pale red-brown. It was awarded a first-class certificate by the Royal Horticultural Society on February 10th last. It is curious to note that both the parents are themselves hybrids.—*Gardeners' Chronicle*, February 14th, pp. 214, 215.

Bulbophyllum inflatum, Rolfe.—This is a very remarkable little Bulbophyllum, which was received from Sierra Leone in 1887, and flowered in the Kew collection in 1889, and again in the following year. It is closely allied to *B. comatum*, Lindl., a species from the same country, not known in cultivation, though quite distinct in its inflorescence. The racemes are like pendulous, egg-shaped masses of yellowish green, hairy flowers. This peculiarity is owing to the shape of the rhachis, which is swollen in a remarkable manner, forming a solid, fleshy, ellipsoidal body, an inch long by half as broad, on which the flowers are densely arranged. The hairs on the flowers are remarkable in their origin. Each sepal is strongly keeled, and it is these keels, particularly those of the lateral sepals, which break up into long hairs, while the margins of the sepals are almost or quite smooth. The name is given in allusion to the peculiar swollen rhachis. It is a very free-flowering little species.—*Gardeners' Chronicle*, February 21st, p. 234.

Kew. *R. A. Rolfe.*

Cultural Department.

Some American Oxalis.

I BEGAN many years ago to collect bulbous and tuberous plants, and the genus Oxalis has been a favorite of mine from the beginning, but so incorrect are the names that are supplied with the bulbs that the trouble of identifying the species has been almost equal to the pleasure of possession. It would seem that the names of South African kinds, and of Mexican kinds, however confused among themselves, might be kept distinct, but they are not, for the only firm (an Italian one) which now has the names *O. Jacquiniana* and *O. vespertilionis* on its lists, sends two Cape species to those who order those kinds, though both are Mexican.

About forty sorts are indigenous to Mexico and Central America, including *O. stricta*, which is found the world over, and of these not more than five or six are obtainable. One more of the group, *O. Drummondi*, I am glad to find offered this spring by Gillett and Horsford, from whom we always expect something interesting.

The bulbs of the American section are not hard and solid like those of the Cape, but of a much looser structure, and are soft enough to yield readily to the pressure of the finger and thumb. All the kinds are summer-blooming. *O. lasiandra* has been in cultivation in this country longer than any other Mexican sort, having been introduced many years ago by James Vick, who saw it used as an edging in European gardens. Its flower and leaf stalks reach a height of twelve or fourteen inches, and, as their growth is not so tufted as in the other kinds, they look somewhat weedy before the season is over, the tall stalks, with the remains of the early blossoms, lying out in all directions. Nevertheless the plant is well worth growing. Its leaves are composed of from five to nine long, narrow, dark-green leaflets, radiating like the leaves of *Cyperus alternifolius*, altogether unlike those of any other Oxalis I have ever seen. The flowers are bright rosy crimson, of medium size, and produced in clusters.

Oxalis Deppei is a very fine species. Its foliage is light green, of the familiar clover-leaf form, each leaflet being marked with a broad chocolate-colored mark like the letter V. The flowers are light crimson, and are produced all summer. The foliage of this and the following kinds is very dense and tufted, and, of itself, no slight ornament to a garden.

O. tetraphylla has four leaflets instead of three to each stalk; their color is much darker than in *O. Deppei*, and the blotch is deep brown. When the leaflets are unfolded the four combine in such a way as to make a nearly perfect square. The flowers are lilac, with a white centre, and, like those of the other species here described, are produced in abundance from June until frost appears.

O. latifolia has flowers much like those of *tetraphylla*, but the leaflets, which are arranged in threes, are very broad, and have a deep, wide notch in their outer sides.

O. lilacina is another species much resembling *tetraphylla*. Its flowers are a little smaller, and a little lighter in tint, and its rounded leaflets are in threes. No one who has one of these needs the other, unless he desires to grow as many species as possible.

I have two other species under the name of *O. elegans*. One is undoubtedly a variety, *O. hirta*, a South African species; the other, though evidently American, being much like the species already named, in time of blooming and general appearance, is very unlike the true *O. elegans*, which is a Peruvian species of great beauty, if we may trust the figure in the *Botanical Magazine*.

O. umbrosa is a very pretty species to plant in clumps or lines, as its foliage is very dense and very bright and fresh in color. It has no zone of brown as most of the other kinds have. Its flowers are white.

The Committee on Nomenclature of the Society of American Florists will do horticulture a service if they will stop the sale of this species under the name of *O. Deppei*, as is now done by many dealers.

All of the species described in this article are very susceptible to cold; the least frost kills the tops, and, of many hundred bulbs left out over winter, not one has lived until spring. In growing these sorts care must be taken not to plant *O. tetraphylla* and *O. latifolia* near any other sorts, as they send out subterranean runners to the distance of twelve or eighteen inches, each bearing a new bulb at the tip—a habit of growth which results in mixing the kinds if they are closely planted. The other kinds make their new bulbs in a cluster at the crown of the plant.

All of these kinds have a translucent root, shaped like a carrot. These are eaten in Mexico, but they have a disagreeable smoky flavor, very unacceptable to a civilized taste.

Canton, Mass. *W. E. Endicott.*

Odontoglossum nebulosum.

WHETHER it is that this large-flowering species is somewhat difficult to grow satisfactorily, or that it does not produce its handsome blooms in greater abundance, it does not seem to be so highly appreciated as some smaller kinds, and it is rarely that a good word is spoken in its favor in the horticultural press. The flowers, which are borne on strong erect scapes, are from two and a half to three inches across, having white sepals and petals, the lower half of which is decorated with chestnut-brown blotches of irregular shape, and somewhat paler on the sepals; the roundish, wavy-edged lip is also white, with some large chestnut blotches in front of the bright yellow, two-lobed crest, which has sometimes small red spots all over it. The pseudo-bulbs are of moderate size, ovoid and flattish, with two sharp edges, and bearing two deep green lanceolate leaves, each about six to nine inches long, on the summit.

Great variation exists among the flowers, the result no doubt of cultivation. In some forms the sepals and petals are large and well-arranged, the chestnut blotches standing out prominently on the white ground; in others the segments are small

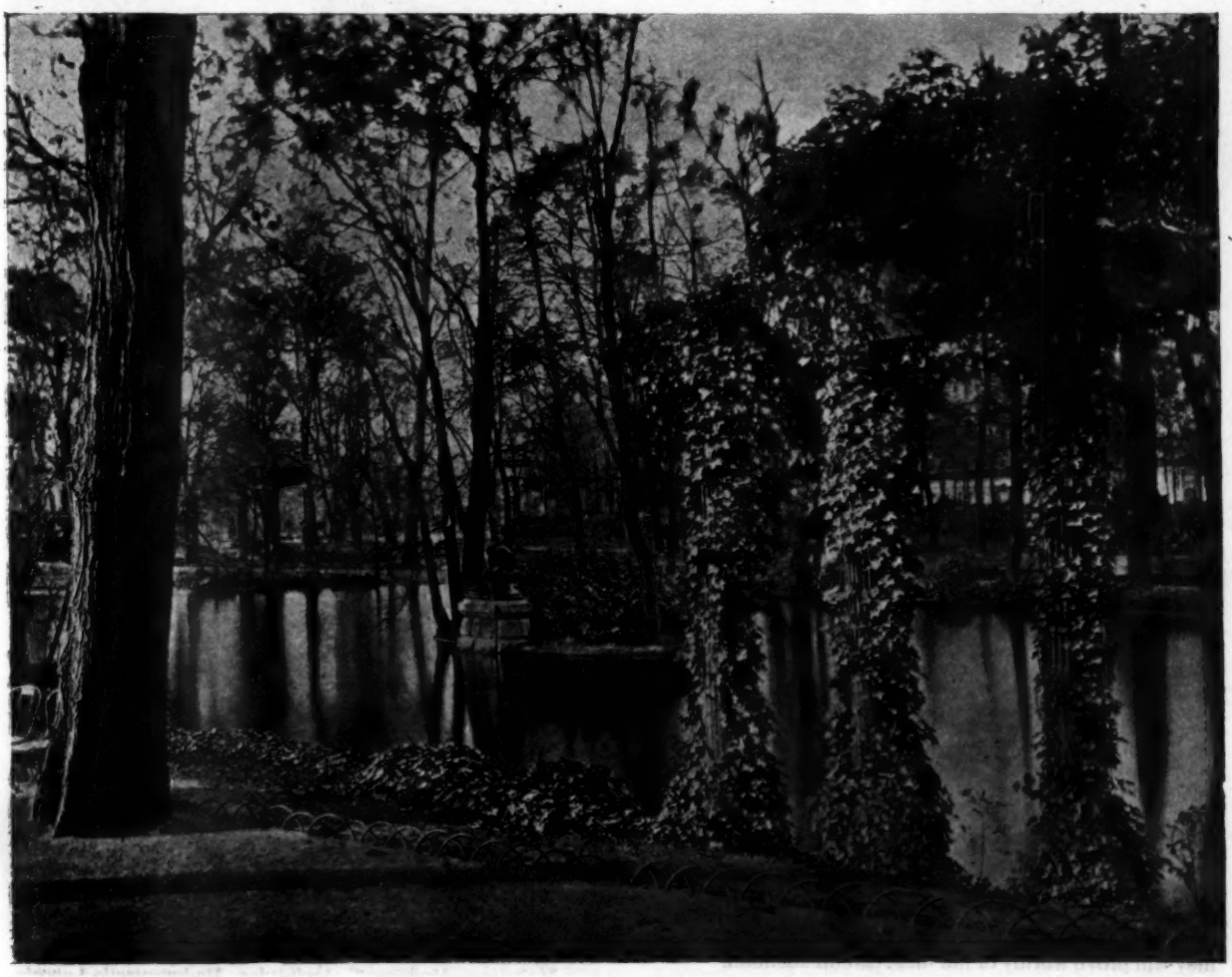

Fig. 30.—View in the Parc Monceau, Paris.—See page 159.

and badly shaped and of a dirty greenish white color, which gets confused with the blotches. Three varieties are recorded. One of them, Candidulum, was introduced over thirty years ago, it is said, by Messrs. Low, of Clapton, a form with no blotches on the sepals and petals, and only one or two, or even none, on the lip. This seems to be the same as the plant sometimes called Candidissimum. The variety Pattisonianum is not well known. Reichenbach described it in 1868 as having large white flowers, and as being a native of Oaxaco, whence it was introduced by Baron Karwinski. The name commemorates Dr. Pattison, who was the first to flower this plant, and *Phalænopsis Luddenanniana*, in England.

About 1833 the typical *O. nebulosum* was found growing on the trunks of Oak-trees in Oaxaca, Mexico, by Baron Karwinski, but it was not until the severe winter of 1837–38 that it found its way into cultivation in England through the means of Mr. Bateman, and then the first consignment did not last long, as the plants were coddled in a too high temperature, in accordance with the inexperienced views of Orchid-growers of that time. Some years later two other well-known plant collectors—namely, Galleotti and Ghiesbreght—obtained plants of this species, and the latter sent a consignment to Monsieur Linden, in whose establishment at Ghent it flowered in 1856. Since this time it has often been imported, but not in great quantities.

A temperature varying from sixty to sixty-five degrees Fahrenheit in winter to seventy or seventy-five in the height of summer is suitable for *O. nebulosum*. In late spring-time growth begins, and constant attention to watering is requisite from this time and onward during the summer months. The plants should be shaded from the sun when it becomes very hot, and plenty of air ought to circulate through the house without causing one to feel a draught. The usual compost of rough fibrous peat, with a little fresh sphagnum moss and charcoal, in combination with first-class drainage, is required in order to grow strong, healthy plants, with a fair show of flower-spikes.

Isleworth, London, W. *John Weathers.*

Zonal Pelargoniums for Winter Blooming.

PERHAPS the so-called Geranium is more widely known and grown than any other garden plant, and its dazzling colors are seen everywhere in summer. But its true value is never known or thoroughly appreciated until it is used for decorating a conservatory or window-garden in winter. In the summer season a sudden storm will destroy its masses of flowers in an incredibly short time, and days must elapse before the plants regain their fair appearance; but this is not the case with specimens protected from the weather, which produce an uninterrupted and brilliant display through the dull winter months. Besides this, it is only with such treatment that the best color of each individual variety is secured, and the infinite variety of tints, from the deepest crimson to the purest white, is defined. It is true that there are certain varieties which are most useful when grown out-of-doors during the summer, while others are only valuable for conservatory decoration. It is therefore necessary to have a selection from both classes if we would have a continuous bloom.

Many people think that greenhouse space had better be reserved for something better than Zonal Pelargoniums, and, therefore, those plants which are used for bedding in the summer are simply kept alive during the winter in a starved, kept-over condition. But if the best winter-flowering varieties are selected, and have an opportunity given them to develop, they will prove worthy of the most careful attention.

For successful winter-flowering Geraniums must be grown especially for the purpose, just as roses are grown. Strong cuttings should be taken from April to June, according to the size of the plants desired, and their duration of flowering, and inserted singly in small pots of sandy loam. Cuttings may also be rooted in sand and afterward potted, if care is taken that they should neither be dried up nor drenched with water. As soon as they have made a new growth, and the small pots are filled with young and active roots, they should be re-potted into four and a half or five-inch pots, using this time, as a potting soil, two parts of fibrous loam to one of thoroughly rotted manure. An old spent hot-bed, where leaves have been liberally used in making it, is an excellent manure, and so is a spent mushroom-bed. Of course, if the loam is stiff it will be necessary to add some sand to keep the soil open, and the pot should be carefully crocked and drained, because these plants need frequent watering in hot weather. Over a layer or two of crocks in the pot a thin layer of cinders that have been sifted through a sieve with a half-inch mesh will serve to keep the soil out of the crock and, at the same time, keep earth-worms from the soil, as they do not like to travel through the sharp cinders. The plants should be placed in an ordinary frame, on a good cinder ash bottom, and protected from drenching rains and wind and scorching sun. When planted out they need all the sun they can possibly get, but, while in pots, they will dry out so much more quickly that it is preferable to shade them a little to prevent the roots from drying, for this would give them a serious check.

The plants should be pinched back to make them bushy, and all flower-stalks should be picked off as soon as they are large enough to handle, and early in August those which are meant for early flowering should have their last shift into nine or ten-inch pots, in which the soil may be rather coarser than that in which they have been growing. They should be kept out-of-doors, watered well and well guarded against the ravages of caterpillars, which are apt to eat the under side of the leaves, and disfigure them. They should be housed in September, although, if the weather is dry, they may remain out longer, but the plants will suffer if the weather is damp and cold. A warm, airy and light house is best for them, and the temperature should be kept at from fifty-five to sixty-five degrees. They will need a few stakes, which are slightly spread, and the shoots should be tied so as to keep the centre of the plant open. The pinching of the flower-buds should be discontinued, but any strong-growing roots should be pinched back. After the pots are filled with roots weak liquid manure should be given occasionally, and also a top-dressing of well-rotted manure and a little bone-flour. Good plants in six-inch pots may be had from cuttings struck in June.

The following is a good list of varieties suitable for the conservatory or window-garden:

Single-flowered Varieties.—White: Queen of the Whites, Improved, International, Lily, Mrs. Benedict. Pink: Lady F. Russell, Mrs. Joynson, Norah. Salmon: Countess of Derby, Mrs. D. Saunders. Purple and Magenta: Richard Dean, Dr. R. G. Tucker, Lord Churchill. Crimson and Scarlet: Mr. H. Cannell, Brilliant, H. Cannell, Jr., Hyacinth, Rev. H. Harries, Lynette, Judge Brown, Fiery Cross.

Double-flowered Varieties.—White: La Cygne. Salmon; Queen of the Fairies. Scarlet: Golden Dawn, M. Bruant. Pink: Mary Geering, Glorie de France. Deep Crimson: Black Knight.

Dongan Hills, Staten Island. *W. Tricker.*

The Best Chrysanthemums in England.—The yearly analysis of the leading Chrysanthemum-blooms shown at the numerous English exhibitions is always interesting to those who make a specialty of this flower everywhere. While American varieties are becoming very numerous and taking year by year a leading place in our exhibitions, no grower can afford to neglect the varieties among which our English friends find the prize-winners. Comparatively little interest seems to be taken here in the Chinese incurved section, no stand of these worthy of notice having ever been seen at any of our shows. As a matter of interest we note the leading twelve varieties of 1890 at English exhibitions in the order of their rank: Miss M. A. Haggas, Miss Violet Tomlin, Empress of India, Queen of England, Lord Alcester, Golden Empress of India, Jeanne d'Arc, Lord Wolseley, John Salter, Princess of Wales, Prince Alfred, Golden Queen of England. As compared with former audits, this shows a falling off of Empress of India, which variety has occupied the foremost place for a number of years. The leading Japanese varieties show the usual shifting of places. The first dozen were: Etoile de Lyon, Sunflower, Avalanche, Edwin Molyneux, Madame C. Andiguier, Mademoiselle Lacroix, Val d'Andorre, Maiden's Blush, Jeanne Délaux, Stanstead Surprise, Mr. Ralph Brocklebank, Stanstead White. Eight of these varieties are introductions of 1886 and later. Whether the new kinds are really so superior to the older varieties, or simply that their novelty causes them to be grown more largely, only future exhibitions will show. It is curious to observe the almost entire absence of American varieties from the list of sixty-three varieties, Volunteer (Henderson) being Number 45, and Florence Percy (Allen) Number 46. The latter variety, like Mr. Ralph Brocklebank, is not highly esteemed with us, as it always comes very thin.

Elizabeth, N. J. *J. N. G.*

Ipomœa pandurata.—This plant is going the rounds of the catalogues as the "Perennial Morning Glory," and it will probably be widely distributed this year. It is quite safe to say that all who buy the plant will also buy experience. It is also true that the plant is very beautiful, a perennial and quite

hardy, being a native plant, and, according to Gray, found from Connecticut to Illinois and southward.

I well remember finding it wild for the first time and bringing specimens to the late Dr. Thurber for name. His words I repeat as nearly as my memory will permit: "Don't plant it, or if you do, don't try to dig it up, for if you do you will have a task that will last for years." His advice sufficed for me, and it was left to ramble over its native hedgerow where it was very ornamental. The plant has a very thick root which penetrates deeply, and every particle of this root, when broken off, will grow, so the more one tries to dig it up the more persistently does it appear over a wider area. But if one plants it where it is to remain to be gazed at for a lifetime, it would probably not spread or cause trouble. But there comes a time, in the history of most plants, when it seems best to remove them, or replace them with something else, or to dispense with them altogether. When that time in this Ipomæa's history arrives, trouble is to be apprehended. The moral is to plant the vine on a back fence or hedgerow, and not in any dressy part of the garden.

S. Lancaster, Mass. *O. O.*

Tomatoes under Glass.—In providing for a second crop of these, a trial is now being made of some unusual methods. Instead of raising seedlings to take the place of the old plants from which a crop had been removed, a large portion of the earth was removed from the boxes in which they grew, and the plants were coiled around in the boxes and covered with fresh earth, the ends of the plants being left projecting above the surface. In another lot the old plants were cut down nearly to the surface of the ground, and a single shoot was allowed to grow up from the stem. In both cases the young shoots, having all the roots of the mature plant to support them, have grown with great vigor. Both of these methods, but especially the second, seem to indicate at present that a considerable reduction in the interval between successive crops may be made by their use, as the plants have far outstripped, in growth and flowering, the seedling plants of the usual size which were transplanted beside them at the same time.

Cornell University. *C. W. Mathews.*

The Forest.

Prairie Forestry and the Timber Culture Law.—I.

THE proposed repeal of the Timber Culture Law, with no provision suggested whereby Government will offer any encouragement for the planting of trees on the treeless prairies, has led me to look into the question of how far the law has been instrumental in promoting tree-planting on the wind-swept plains. I began the study of this question with the impression that I had only to consult the records of the Government Land Office to find incontestable proof of the wisdom and value of the law. Such incomplete data as I have been able to secure have not inclined me toward the enthusiastic support of the measure in its present form, but I do not believe the figures warrant the repeal of this important law unless Government is ready to adopt a comprehensive system for the conservation of forests on the public domain, and attempt the planting of timber of its vast treeless plains. Little has been accomplished in the way of successful tree-culture under this law, much less would have been done had Government offered no inducement to the settler to plant trees.

In the land offices at Huron, Watertown, Mitchell, Aberdeen and Yankton 53,499 entries have been made under the Timber Culture Law. Had every entry thus made represented a different piece of land this figure would indicate the presence of 534,990 acres of trees on 53,499 sections of land, for but one timber-claim can be located on a section. But the figure first given represents the total number of entries, and when a claim is relinquished the land is returned at once to the public domain and is again subject to entry. The statistics of the Land Office are very faulty in this, and no data are obtainable by which the exact number of different pieces of land entered as timber-claims could be known. The Mitchell office reports 15,231 entries, 4,000 relinquishments and 920 proofs. The 15,231 includes all entries that may have been once or twice relinquished, and hence does not give a correct idea of the acres held under the law; neither do the 920 proofs thus far made afford a basis for estimate, because probably the majority of tree-claims are not yet old enough to be proven up. The Aberdeen office reports 7,287 entries, and the Register estimates 5,319 cancellations.

The authorities of the General Land Office at Washington estimate that ninety per cent. of all the timber-culture entries in the country are either fraudulent or failures. The final proofs submitted at the offices named above number 2,890, making about five per cent. of the entries; this would seem to prove the estimate a good one. But, granting the very great number of failures, the Timber Culture Law has placed on the prairies of South Dakota 28,920 acres of timber, every acre of which contains at least 675 trees; 2,890 groves on lands that otherwise would probably have remained treeless for an indefinite period. It is true that many of the claims on which proof has been accepted are far from being ideal groves, either in the quantity or quality of the trees that compose them, but a single winter in this windy state will teach that every tree that grows is worthy of respect.

Nearly all the settlers of Dakota came from the regions far better adapted to tree-culture than their new home. Naturally, when they saw the luxuriant growth of grass that covered the prairies, they concluded that the Timber Culture Law offered the easiest and cheapest means of securing land. Government designed to cover the naked prairies with groves, the ameliorating influence of which should be apparent in increasing ratio as the trees grew older. From the standpoint of the law the settler's first duty was to cultivate his trees and make his plantation a success; but he saw in the trees only one element of value, a means of securing a quarter section of land for a very small amount of money and effort. He soon found that the ten acres of trees, which brought no money return, demanded care and time which could be made an element of profit if put on the remaining acres of his claim. Every part of his tree-claim was a source of income but the ten acres which gave him title to it, and these were a constant expense. A very great number of those who made entries regarded the ten acres of trees as the one incumbrance on the land thus secured, and all such people naturally gave what they considered the least possible care to the trees that would insure them a title to the land. Many people believed that very little cultivation was necessary for trees (indeed, there is still prevalent a popular belief that too much cultivation is ruinous), and when to the wrong ideas of the inexperienced new-comer is added a lack of interest in trees for their own sake, the chances for success would be greatly against him. At the time when the greater part of the timber-culture entries in South Dakota were made, from 1880 to 1885, it was honestly believed by many settlers that trees would grow with very little care. When the trees died, as the great majority of them did, the planter attributed the failure to an "off year," and did not learn that no part of his land demanded so much attention as the ten acres that he had especially promised to care for.

The two causes for the many failures in tree-culture in this state are the planter's ignorance and his failure to cultivate intelligently. From what I have seen of tree-claims during my residence in the state I can testify that wherever trees were well planted and intelligently cultivated success was attained. I know of successes in the most unfavorable parts of the state, and failures are common in those parts of the state having the most rain-fall.

The great number of relinquishments have been in the hands of men who have been badly disappointed. Instead of being the cheapest way of securing Government land, any one who has proved up a tree-claim is very apt to say it is the most expensive land he owns. Congress was honest in making the law, and settlers thought they had a rare bargain. But both were deceived.

Agricultural College, Brookings, S. D. *Charles A. Keffer.*

Correspondence.

Notes on Nomenclature.

To the Editor of Garden and Forest:

Sir,—Nearly all botanists are thoroughly in unison with the present vigorous movement to place botanical nomenclature on a firm footing, in so far as this can be effected by the identification and establishment on the principle of priority of the oldest names of groups and species. Much has already been accomplished in this direction in recently published catalogues, notes, special papers, and notably in Professor Sargent's "Silva of North America" as far as published.

It is true, however, that in two or three peculiar cases the principle of priority has not, as a matter of fact, been rigidly adhered to; although in the particular instances referred to the avoidance of extraordinary combinations was doubtless a reason for not carrying out the law.

Dr. Britton, in his "Catalogue of New Jersey Plants," in referring to the question of reinstating the oldest specific and

varietal names, distinctly states that the "names adopted are based strictly on the principle of priority of publication, the oldest specific or varietal name available being retained in whatever genus the plant is located, or whatever its rank as species or variety."

Professor Sargent, in discussing this point, assumes the same attitude, and states that he has "adopted the method which imposes upon a plant the oldest generic name applied to it by Linnæus in the first edition of the 'Genera Plantarum,' published in 1737, or by any subsequent author, and the oldest specific name used by Linnæus in the first edition of the 'Species Plantarum,' published in 1753, or by any subsequent author, without regard to the fact that such a specific name may have been associated at first with a generic name improperly employed."

In the range of the "New Jersey Catalogue," the author was called upon to consider the specific names of three species—Box-elder, Catalpa, and Sassafras—in the disposition of which we have illustrated the first exceptions in this work to the otherwise rigidly adopted law of priority. Other authors of subsequent publications, in disposing of these plants, have done no less than follow an accepted authority, and have maintained *Negundo aceroides*, Moench; *Catalpa bignonioides*, Walter, and *Sassafras officinale*, Nees. The new Silva, so far as now published, has not, of course, reached these questionable points; nor are we at liberty to anticipate what the author's decision is, or will be, when these cases are reached. We believe, however, that there can be but one decision, that of adopting the law without exception.

We do not wish to be understood as criticising Dr. Britton's position, for he has doubtless critically surveyed the ground upon which this question is raised, and for a good reason chosen to record an exception to the general law of priority already adhered to strictly by zoölogists, though, as it seems, not as closely by botanists. His reason, however, for not, in these instances, taking up the oldest specific name for the Box-elder and Sassafras, cannot, we believe, be for lack of evidence to identify with them Linnæus' earlier names—*Acer Negundo*, *Laurus Sassafras*, and *Bignonia Catalpa*.

But the time has arrived, it would seem, when what may by some be considered as valid objections, in fact positive reasons for calling a halt in the adoption of a certain type of specific name, must be waived, at least if we would appear consistent with the object—stability of nomenclature, toward which we are tending and for which so much hard work has been and is to be done.

The principal errors to be avoided in creating new and in reinstating old names need not be detailed here, but chief among them is that of employing a name which shall, if specific, be distinct from any other used in the same genus. Considering this, therefore, as the primary object in the application of a name, it practically matters but little what the combination finally becomes, by properly locating the plant, so long as it is distinct. It will not be any more easily remembered or better serve to avoid confusion with other names, whether we call it *Negundo aceroides*, or if we restore the oldest specific name, *Negundo Negundo* (Linn.) In other words, a name is a name, and although in the form just given not the most perfect, nevertheless quite as satisfactory as the many specific names in use which either have no meaning at all, or in their significance attribute to a plant a character positively not possessed.

But in urging the necessity of following strictly the law of priority in such cases as that of the Box-elder, we wish not to be understood as recommending the creation of new names in which the generic and specific members are exactly alike, but as referring in the opinion here expressed only to names already published, and therefore unalterable. Furthermore, the framers of the botanical code, in seeking to avoid the creation of such names as *Negundo Negundo*, adopted an article which prescribes that, "In constructing specific names, botanists will do well to give attention to the following recommendations"; and the one which covers this point is, "Avoid specific names having, etymologically, the same meaning as the generic name."

Doubtless this article, together with a natural repulsion felt for so redundant a combination as *Negundo Negundo*, has led botanists to stop short in the restoration of such specific names. But the principle urged in the code, and the spirit of those seeking to carry it out, is that each plant shall bear the "most ancient" designation, "provided it is consistent with the essential rules of nomenclature." And in examining the ground on which inconsistency may be charged in taking up, for example, *Negundo Negundo*, it is obvious that in such an attempt one would be perfectly in line with all of the "essential rules." For it is possible, if not quite fair to suppose from the language of the rule just quoted, that it had for its object only to prevent the original construction of a specific name like its genus; presenting, therefore, an entirely different case from the present difficulty, which is not "constructing" a specific name, but forming a combination in which the "most ancient" name published is applied to the species; so that whether foreseen or not this peculiar difficulty was clearly overlooked, and not provided for in the code.

Aside from the point here raised for settlement, many other troublesome questions have arisen in the attempt to re-establish obsolete names, and, so far as the botanical code furnishes sufficient authority for such difficulties, there is perhaps no reason for departing from accepted decisions. But it seems there are cases which have required further authority, for which botanists have had recourse to laws adopted by zoölogists, particularly ornithologists. In other cases, even a perhaps sufficient law in the botanical code has been discarded for one of the zoölogists' covering the same ground, but with different limitations. An example of this is the somewhat general adoption by botanists of the zoölogists' method of citing the original author of a specific term (when taken from its original genus) in a parenthesis, with the author of the combination outside; whereas, the botanical code requires only the latter name.

It seems, therefore, inasmuch as authority for minor cases has already been derived from the zoölogists, that we can do no better than follow their advice in the present difficulty and adhere without exception to the law of priority, a decision, too, which must tend to still more harmonize the usages of botanists and zoölogists.

If, then, we are to be guided by the zoölogists in the question of taking up for the Box-elder, Sassafras and Catalpa the oldest specific names, which would give for *Negundo aceroides*, Moench (1771), *N. Negundo* (L.) (= *Acer Negundo*, L., 1753); for *Catalpa bignonioides*, Walter (1788), *C. Catalpa* (L.) (= *Bignonia Catalpa*, L., 1753); for *Sassafras officinale*, Nees (1821), *S. Sassafras* (L.) (= *Laurus Sassafras*, L., 1753), to which may also be added the European Larch, *Larix Larix* (L.) (= *Pinus Larix*, L., 1753. *L. Europæa*, DC., 1805), it may be of interest, if not some comfort, to know how many names of this peculiar type are already in use among the ornithologists, mammalogists and ichthyologists.

The following examples among the birds are taken from a revised edition (1889) of the "Check-list of North American Birds," published by the American Ornithologists' Union; those of the mammals and fishes are taken from Jordan's "Manual of Vertebrates" (1888).

Birds: *Soula Soula* (Linn.), *Ajaja Ajaja* (Linn.), *Nycticorax Nycticorax Nævius* (Bodd.), *Porzana Porzana* (Linn.), *Crex Crex* (Linn.), *Gallinago Gallinago* (Linn.), *Vanellus Vanellus* (Linn.), *Lagopus Lagopus* (Linn.), *Zenaida Zenaida* (Bonap.), *Buteo Buteo* (Linn.), *Nyctea Nyctea* (Linn.), *Pica Pica Hudsonica* (Sab.), *Cyanocephalus Cyanocephalus* (Wied.), *Xanthocephalus Xanthocephalus* (Bonap.), *Icterus Icterus* (Linn.), *Carduelis Carduelis* (Linn.)

Mammals: *Vulpes vulpes* (L.), *Gulo gulo* (L.), *Bison bison* (L.), *Phocaena phocaena* (L.); less similar are: *Alce alces* (L.), *Delphinus delphis* L., *Mephitis mephitica* (Shaw), *Mus musculus* L.

Fishes: *Mola mola* (L.), *Hippoglossus hippoglossus* (L.), *Lota lota* (L.), *Sarda sarda* (Bloch.), *Anguilla anguilla* (L.)

Forestry Division,
United States Department of Agriculture. *George B. Sudworth.*

The Western Arbor-vitæ.

To the Editor of Garden and Forest:

Sir,—In your article on this tree, published in Garden and Forest of March 11th, you say, "*Thuya gigantea*, unfortunately, is not hardy in the eastern states, and, like many of the trees of the Pacific forests, it cannot be used to beautify and enrich our plantations." Now, in British Columbia the western Arbor-vitæ grows not only along the coast, but at different places as far eastward as the western base of the Rocky Mountains proper, several hundred miles inland and northward in the region of the Interior Plateau, certainly to beyond the fifty-third and probably to beyond the fifty-fourth parallel of latitude. (See Report of Progress Geol. Surv. Can., 1879-80, p. 171 B.) In these inland stations it flourishes often at a height of several thousand feet above the sea, and is subjected, though for comparatively brief periods, to winter temperatures as low as those of any of the inhabited parts of the Province of Quebec. Arguing from these facts, and from the experience gained with

other trees tending to show that there is a wide margin of variation in hardiness within the limits of a single species, I am inclined to believe that young trees obtained from these inland localities might be successfully grown in the east. The circumstances appear to indicate that the western Arbor-vitæ is not bounded inland by low winter temperatures so much as by aridity of climate. Where the interior climate is dry, the tree is found only in deep humid valleys or ravines. It would thus appear to me to be more than probable that young trees brought, say, from the Selkirk or Gold Ranges of British Columbia, might be successfully established in most sheltered localities even in the eastern states and eastern provinces of Canada. Possibly this experiment has already been unsuccessfully tried, but, if not, it would seem to be worth trying, as the western Thuya when well grown is certainly one of the most beautiful trees on the continent.

Geological Survey of Canada, Ottawa. *George M. Dawson.*

[An attempt was made several years ago to establish the western Arbor-vitæ in the Arnold Arboretum with seedlings raised from seed collected in northern Idaho, where the climate is very severe. The plants, although carefully protected, were not able, however, to survive the Massachusetts winters. Another attempt to find a form of this tree which will prove perfectly hardy in the east should be made with seeds brought from the Selkirk Mountains and from other regions of British Columbia with extreme climates. Perhaps Professor Dawson can aid us in this matter.—Ed.]

Exhibitions.

The Boston Spring Flower Show.

THE spring exhibition of the Massachusetts Horticultural Society, which was held in Boston last week, delighted many visitors, who seemed to find their chief interest in two small natural rock-gardens which had been arranged on the floor of the lower of the two halls of the Society, and filled with forced hardy shrubs, forced bulbs and other perennial plants. The larger of these two collections was set up by Mr. C. J. Dawson, a young gardener in the employ of the horticultural department of the Bussey Institution, and did much credit to his taste and skill in selecting and arranging his material; the other, in which a smaller variety of plants appeared, was the work of the Botanic Garden at Cambridge, which institution exhibited various hardy shrubs in flower. It is always a question whether the surprises and pleasures of spring and the outdoor garden are not dulled somewhat by advancing the season by bringing into winter the plants whose flowers give to spring its peculiar charm, and whether if one sees Narcissi and Tulips, and the flowers of forced shrubs, Lilacs, Japan Apples and Spiræas all winter long, the keen delight which is felt at the north at the sudden change when winter melts into summer, and myriads of flowers open, must lose something of its delightful freshness. There is, however, one decided advantage in an exhibition of this character. It enables people who wish to make a selection of hardy plants to see them in flower just at the planting-time and to see what the best plants are for their special purposes.

It is now very much the fashion to force hardy plants to bloom out of season, and a great show can be made in this way with small outlay of money and without the skill and patience required to bring to perfection winter-blooming tropical plants which are now too much neglected, although they really belong to the winter season, and should then furnish the principal decoration of the greenhouse and conservatory.

Roses and Carnations were shown in large numbers, and, as is the case almost always in Boston, they were of excellent quality. Tea Roses were more abundant than Hybrid Perpetuals, and this, as indicating the return to popular favor of the Tea Rose for winter, is a matter of congratulation. The Tea Rose is the Rose to raise under glass, and no other Rose can equal it in delicate beauty and graceful refinement.

As examples of good cultivation, no plants in the exhibition equaled the group of Cyclamens and Cinerarias shown by Mr. Kenneth Finlayson, gardener to Dr. C. G. Weld, of Brookline. The Cinerarias were selected from a large collection of these plants which have been the horticultural sensation in the neighborhood of Boston during the past month, and which have attracted many visitors. It is not probable that a collection of better-grown or better-flowered Cinerarias has ever been seen, although, unfortunately, the plants in the exhibition were a little past their best. The collection, as seen three weeks ago in Dr. Weld's garden, was a marvel of horticultural excellence. The plants were of a remarkably good strain, bearing a large variety of enormous bright-colored flowers. It may be of interest to note that the seed from which Mr. Finlayson raised these plants was selected by himself from a strain of his own.

Indian Azaleas were shown in a number of specimens in considerable variety; they lacked, however, substance and finish, and showed the effect of having been brought forward in too much heat. Orchids were not up to the standard set in previous Boston exhibitions. Of hardy plants, the most interesting for their novelty was a small group of the beautiful Japanese *Primula Sieboldii* exhibited by Rea Brothers.

Recent Publications.

A Move for Better Roads. Essays on Road Making and Maintenance and Road Laws. Henry Carey Baird & Co., Philadelphia.

This book is one of the fruits of the wide-spread agitation for an improvement in our public highways. These essays are not solely arguments to show how great are the advantages of good roads to both town and country, but they enter into details and go carefully into the principles of road-construction as well as maintenance, and treat of the legislation which is needed to insure the best and cheapest wheelway the year through. The history of the work is this: In November, 1889, Mr. Wm. M. Rhawn offered to contribute, through the University of Pennsylvania, a prize for the best paper on the "Construction and Maintenance of Common Roads." The project received so much encouragement from the Provost of the University and Professor Haupt, the head of the Engineering Department, that the plan was enlarged through the organization of a committee and the opening of a subscription fund, until at last prizes of $400, $200 and $100 were offered by the committee, and the competition was thrown open to all. The first prize was awarded by the very competent Board of Adjudicators to Henry Irwin, Assistant Engineer of the Canadian Pacific Railway; the second prize to David H. Bergey, North Wales, Pennsylvania, and the third prize to James Bradford Olcott, of South Manchester, Connecticut. These essays are collected in this volume, together with five others which received honorable mention in the competition. To them is added a digest of the contents of the remaining essays offered in competition for the road prizes besides some contributions from other correspondents and some notes by Mr. Rhawn, making altogether a volume of more than 300 pages. The work has a good index and a still better table of contents, and, although little that is new can now be said on the subject, the book certainly presents in accessible form such general rules of road construction as non-professional readers ought to be interested in studying. The essays are prefaced by a series of resolutions by the committee to the effect: (1) That in the improvements of roads the Macadam system, consisting of small angular fragments of stone in sizes not exceeding from two to two and a half inches in the longest dimension, according to quality, should be used wherever a stone surface is practicable and justifiable. (2) That the minimum width of the metaled surface for a single track should be a demi-rod, eight and a quarter feet, and of such depth as the amount of traffic and character of the subsoil may require. (3) That the bed to receive the stone must be so prepared that it cannot be saturated with water, and, therefore, great attention should be given to the character and drainage of the subsoil. (4) That the width of the tires of wheels should be regulated by law, and that the minimum width of all heavy draught vehicles should be four inches, to be increased when the capacity of the vehicle exceeds half a ton per wheel at the rate of one inch for each 400 pounds in excess.

Stone of the proper quality for making a good road-surface is abundant in most parts of the country, and where it cannot be cheaply procured some fair substitute can be found, so that there is no reason why a few sample miles of the best possible road cannot be constructed in every township of the country which is sufficiently populous to justify this expense. This is the first step needed in road-reform. The chief reason why the people of the country do not insist upon better highways is, that they have never seen a mile of good road. When once they learn by experience what advantages are secured to them by the best roads, they will not rest until the common roads receive the same attention that is given to railroads. It is to be hoped that this book will have a wide circulation, for it will disseminate just such information as will prove of practical value in hastening forward the construction of these model bits of highway which must prove beneficial as object-lessons.

Notes.

In a portion of our edition last week the article entitled "Points in Chrysanthemum Culture" was not credited to Mr. John Thorpe, as it should have been.

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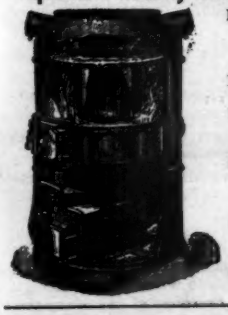
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Garden and Forest is under the editorial direction of Professor C. S. Sargent of Harvard College, assisted by Professor A. S. Packard of Brown University and Professor Wm. G. Farlow of Harvard College.

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